SUMMARY OF RESULTS FROM THE CALIFORNIA PESTICIDE ILLNESS SURVEILLANCE PROGRAM
- 2004 -

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Pesticide Illness Surveillance Program – 2004

Executive Summary

The California Department of Pesticide Regulation's Pesticide Illness Surveillance Program (PISP) seeks to identify all types of pesticide illnesses. While DPR's Worker Health and Safety Branch strives to collect as many individual reports on illnesses and injuries as possible, within resource constraints, our primary goals are to identify high-risk situations that warrant regulatory action; and to promote pro-active, health-protective measures, especially for workers who most frequently face the highest pesticide exposure risks.

The 2004 PISP summary continued to capture the full range of pesticide illnesses in California, with 1,238 cases investigated (compared to 1,232 investigations in 2003). Pesticide exposure was suspected or confirmed in 828 cases in 2004, compared to 802 cases in 2003.

Occupational exposures accounted for 91 percent (757 cases) of suspected or confirmed exposures in 2004. Some 53 percent (438 cases) were resulted from non-agricultural pesticide use, while 47 percent (390 cases) were related to agricultural pesticide use.

The number of suspected pesticide residue injuries to farm field workers in 2004 remained low, with 68 cases reported, compared to 58 the prior year and 78 in 2002. This continues a long-term decline since the 1980s, when more than 350 workers were injured in some years. That decline occurred even as DPR substantially upgraded its efforts to detect such illnesses. DPR remains confident that the PISP program identifies virtually all events in which groups of people receive medical evaluation for pesticide exposure, and captures a sufficient fraction of occupational cases to detect emerging problems.

Likewise, DPR continues to emphasize the reporting of pesticide drift incidents, agricultural and non-agricultural. The number of suspected or confirmed agricultural drift illnesses declined for the third consecutive year in 2004 (233 cases and 37 episodes, compared to 256 cases and 33 episodes in 2003; compared to 478 cases and 39 episodes in 2002). However, the nature of pesticide drift incidents continues to be a source of major regulatory and legislative concern.

For example, Gov. Schwarzenegger signed Senate Bill 391 (Florez, D-Fresno) in 2004. It was aimed at drift incidents that caused non-occupational injuries. SB 391, which took effect in 2005, makes pesticide users responsible for medical costs incurred when pesticide misuse affects bystanders. The law also called for statewide, emergency guideline for local responders during pesticide incidents. Those protocols will be completed this year.

Suspected or confirmed, non-occupational cases have fallen dramatically in recent years, from 522 in 2002 to 249 in 2003 to only 71 in 2004. Although non-occupational pesticide cases have contributed up to 50 percent or more of all suspected illnesses in recent years. Part of the decline may be attributed to fewer drift incidents involving neighborhoods in 2004. DPR investigators were also hampered by a lack of reporting.

Budget constraints forced DPR to end its work with the California Poison Control System in November 2002. That collaboration had provided a significant number of non-occupational illness reports. In addition, DPR researchers noted an ongoing problem with physicians who fail to report suspected pesticide illnesses to their county health officers, as required by state law.

In response, DPR and the Office of Health Hazard Assessment (OEHHA) are cooperating on a project to improve the timeliness, quality, and completeness of illness reporting and follow-up investigation. Funded by a $750,000 grant from the U.S. Environmental Protection Agency, the project intended to create a Web-based system for pesticide incident reporting in cooperation with County Health Officers and investigation, in cooperation with the County Agricultural Commissioners. However, the project was stalled by software problems and legal concerns regarding patient confidentiality. DPR continues to work with OEHHA on a pilot project.

This document was revised in April 2006 to include this executive summary as it was omitted upon initial release.

Background on the Reporting System

The California pesticide safety program, which the Department of Pesticide Regulation (DPR) administers, is widely regarded as the most stringent in the nation. Mandatory reporting of pesticide[1] illnesses has been part of this comprehensive program since 1971. It is the oldest and largest program of its kind in the nation, and supplies data to regulators, advocates, industry, and individual citizens.

The U.S. Environmental Protection Agency (U.S. EPA) and the National Institute for Occupational Safety and Health (NIOSH) have encouraged other states to develop programs similar to California's. Through NIOSH's Sentinel Event Notification System for Occupational Risk (SENSOR), they now partially support programs in the states of Michigan, New York, and Washington. SENSOR also provides technical assistance to the states of Arizona, Florida, Louisiana, Oregon, and Texas. In addition, it supports pesticide-related work by the Occupational Health Branch of the California Department of Health Services, which coordinates with DPR's Worker Health & Safety Branch (WH&S). U.S. EPA continues to rely heavily on California data for evidence of pesticide adverse effects because of the large size and long historical perspective of the database.

DPR scientists participate in the national working group on pesticide illness surveillance that NIOSH convened to develop standards for information collection. DPR's 1998 expansion of the Pesticide Illness Surveillance Program (PISP) database incorporated several features from the NIOSH standards. These upgrades have been applied to all data collected from 1992 through the present. Data earlier than 1992 have not been revised to incorporate the 1998 database upgrades, and will be presented only when historical perspective is important.

Excessive exposure to pesticides may cause illness by various mechanisms, and the surveillance program attempts to monitor all of them. Every pesticide active ingredient has a pharmacologic

[1] "Pesticide" is used to describe many substances that control pests. Pests may be insects, fungi, weeds, rodents, nematodes, algae, viruses, or bacteria -- almost any living organisms that cause damage or economic loss, or transmit or produce disease. Therefore, pesticides include herbicides, fungicides, insecticides, rodenticides, and disinfectants, as well as insect growth regulators. In California, adjuvants are also subject to the regulations that control pesticides. Adjuvants are substances added to enhance the efficacy of a pesticide, and include emulsifiers, spreaders, and wetting and dispersing agents.

effect by which it controls its target pests. Pesticide products may have other potentially harmful properties in addition to the qualities designed to control pests. PISP collects information on adverse effects from any component of pesticide products including the active ingredients, inert ingredients, impurities, and breakdown products. Whether pesticide products only act as irritants or as allergens, through their smell or by causing fires or explosions, or have the potential for more severe effects, DPR's mission is to mitigate any exposure that compromises health.

Sources of Illness Information

Under a statute enacted in 1971 and amended in 1977 (now codified as Health and Safety Code section 105200), California physicians are required to report any suspected case of pesticide-related illness or injury, regardless of whether it occurred on a farm, in a home, or in any other situation, by telephone to the local health officer within 24 hours of examining the patient. Each California county has a health officer with broad responsibility for safeguarding public health, and a few cities have chosen to have their own health officers. These officials may investigate pesticide incidents to whatever extent they find useful. The law only requires them to inform the county agricultural commissioner (CAC), to complete a pesticide illness report (PIR), and to distribute copies of the PIR to the Office of Environmental Health Hazard Assessment (OEHHA), the Department of Industrial Relations (DIR), and DPR.

DPR strives to ensure that the PISP captures the majority of significant illness incidents and records them in its database. For several years, DPR worked with the California Poison Control System (CPCS) to assist in identifying potential pesticide illnesses. Before 2000, DPR scientists managed two pilot projects in which CPCS specialists offered to report pesticide-related illnesses on behalf of physicians. Funds from U.S. EPA supported development of an enhanced system of poison control facilitation, which operated from mid-2001 through November 2002. Cooperation with CPCS identified hundreds of symptomatic exposures that otherwise would have escaped detection, but the State’s fiscal crisis prevented continuation of the contract after federal funding ended. Negotiations continue for resumption of poison control participation in pesticide illness reporting under a contract with OEHHA using federal funds.
OEHHA poison control negotiations are part of a broader effort to improve reporting timeliness and completeness. The federal grant to OEHHA, DPR, and the California Environmental

Protection Agency also supports another major initiative: integration of the mechanism for reporting pesticide-related conditions into the system by which doctors file other required reports. The California Department of Health Services has undertaken a software development project, WebCMR, to support physician report submission via the Internet. When this project is complete, doctors will be able to enroll in a system that gives them access to a Website that complies with the security requirements of the Health Insurance Portability and Accountability Act. This site will accept reports on all conditions that doctors must report, including pesticide illness cases. The site will also feature links to resources related to the condition being reported. DPR has collaborated with OEHHA to identify critical information to collect and the most useful resources to offer. While awaiting development of the statewide system, OEHHA and DPR are working with San Diego, Monterey, and Fresno counties to pilot test coordinated reporting and investigation of pesticide-related incidents.

As another route to identify pesticide cases that currently may go unreported by doctors, DPR has negotiated a memorandum of understanding with DIR and the California Department of Health Services, under which scientists review Doctor's First Reports of Occupational Illness and Injury (DFROIIs, documents that California's Labor Code requires workers' compensation claims payers to forward to DIR). Scientists select for investigation any DFROII that mentions a pesticide, or pesticides in general, as a possible cause of injury. Reports that mention unspecified chemicals are also investigated if the setting is one in which pesticide use is likely. From 1983 through 1998, DFROII review identified the majority of the cases investigated. From 1999 through 2002, DPR received increasing numbers of case reports through CPCS, and the fraction located by DFROII review fell first to one-third and finally to one-fifth of all investigations. Since the contract with CPCS lapsed, DFROII review has become more prominent again, and in 2004 accounted for 57 percent of the cases investigated.

The agricultural commissioners of the counties where exposures occurred investigate all identified incidents, whether or not they involved agriculture. They attempt to locate and interview all the people with knowledge of the pesticide exposure event, and also review relevant records. Their investigations determine how exposure occurred, characterize the subsequent illnesses, and determine whether pesticide users complied fully with safety requirements. DPR

provides instructions, training, and technical support for conducting investigations. These instructions include directions for when and how to collect samples of foliage, clothing, or surface residues to document environmental exposures. As part of the technical support, DPR contracts with a specialized laboratory to analyze the samples. In 2005, DPR's PISP scientists and Enforcement Branch staff completed a joint effort to update and consolidate the investigation manual that CACs use. Among other enhancements, the revised manual provides guidance in developing plans for conducting illness investigations and in writing clear and complete narratives to record investigation results. The manual also incorporates a protocol for investigations of public exposure episodes involving large numbers of people, and documents DPR's policy on complaints or illnesses related to odor. Briefly, the policy recognizes that detectable odor inherently demonstrates exposure, and states that such reports must be investigated seriously.

The CACs prepare reports describing the circumstances in which pesticide exposure may have occurred and any other relevant aspects of the case. When appropriate, they request authorization from the affected people to include relevant portions of their medical records with the report. Medical record authorizations always include commitments to maintain confidentiality. When investigations identify additional affected people (not previously reported by other mechanisms), they are identified in the investigation report and recorded in the PISP database. DPR scientists evaluate the physicians' reports and all the information the CACs have gathered. They then classify incidents according to the circumstances of pesticide exposure.

DPR evaluators undertake a complex evaluation of medical records and investigation reports to determine the likelihood that a pesticide exposure caused the incident. Standards for the determination are described in the PISP program brochure, "Preventing Pesticide Illness," which can be viewed or downloaded from the DPR Web site at www.cdpr.ca.gov/docs/dprdocs/pisp/brochure.pdf.

Purpose of Pesticide Illness Surveillance

DPR maintains its surveillance of human health effects of pesticide exposure in order to evaluate the circumstances of pesticide exposures that result in illness. The PISP database provides the means to identify high-risk situations warranting DPR action including implementing additional California restrictions on pesticide use. For example, taking illness data into consideration, DPR may adjust the restricted entry interval following pesticide application, specify buffer zones or other application conditions, or require pesticide handlers to use protective equipment that meets certain standards.

DPR scientists regularly consult the data collected to evaluate the effectiveness of DPR's pesticide safety regulatory programs and assess the need for changes. Review of 2000-2002 field worker reentry violations (McCarthy, 2004) found that CACs' investigations were more complete than they had been in 1991-1999, and that the commissioners' offices "reacted strongly in almost all of the episodes." Nevertheless, the majority of investigations lacked information on compliance with hazard communication and application-specific information display. An episode of phosphine exposure at a nut processing plant prompted WH&S industrial hygienists to inspect the facility (Fong, 2004) and recommend safety improvements.

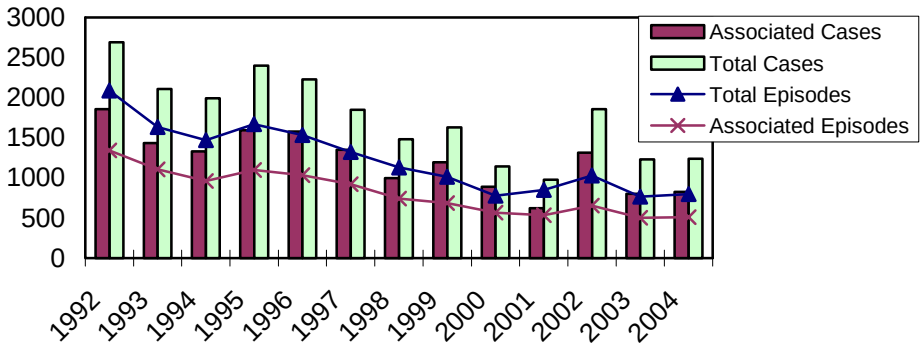
In some instances, changes to pesticide labels provide the most appropriate mitigation measures, and DPR cooperates with U.S. EPA to develop appropriate instructions for users throughout the country. If an illness incident results from illegal practices, state and county enforcement staff take appropriate action designed to deter future incidents.

2004 Numeric Results -- Totals

In 2004, DPR and CACs investigated 1,238 cases, which is almost identical to the total of 1,232 (DPR 2004) investigated in 2003 (see Figure 1). The similar totals reflect similar circumstances: Agricultural pesticide drift exposed a large group of people (farm workers in 2004, versus local residents in 2003), and relatively few non-occupational exposures were identified. There were 97 instances of suspected non-occupational exposure identified for investigation, of which 71 proved at least possibly related to pesticide exposure. In 2002, the most recent year of CPCS

cooperation, CACs investigated 725 such cases, and documented at least a possible relationship for 522 of them.

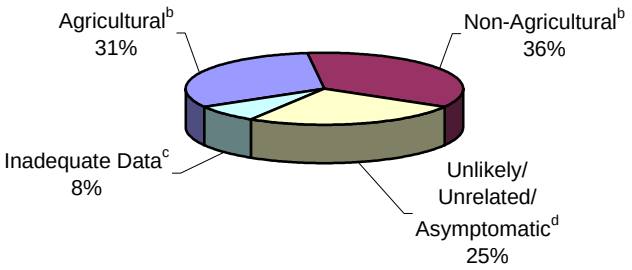
Figure 1: Number of Cases vs. Number of Episodes, 1992 - 2004



A case is the Pesticide Illness Surveillance Program representation of a person whose health problems may relate to pesticide exposure.
An episode is an event in which a single source appears to have exposed one or more people (cases) to pesticides.
Associated cases are those evaluated as definitely, probably, or possibly related to pesticide exposure. A relationship of definite indicates that both physical and medical evidence document exposure and consequent health effects. Probable relationship indicates that circumstantial evidence supports a relationship to pesticide exposure. Possible relationship indicates that evidence neither supports nor contradicts a relationship
Associated episodes are those in which at least one case was evaluated as associated.

Of the 1,238 cases investigated, DPR found that pesticide exposure had been at least a possible contributing factor to 828 (67 percent). Evidence established an unlikely or unrelated relationship to pesticide exposure for 314 (25 percent) of the 1,238 cases assigned for investigation. Lack of information prevented evaluation of 96 (8 percent) (Figure 2).

Figure 2: Outcome of 2004 Illness Investigations[a]



[a] Total cases investigated = 1238.
[b] *Agricultural* and *Nonagricultural* refer to the intended use of the pesticide.
[c] *Inadequate* means that there was not enough data available or reported to determine if pesticides were involved in the case.
[d] *Unlikely/Unrelated/Asymptomatic* refers to cases determined as unlikely related or unrelated to pesticide exposure or the exposed person did not develop symptoms.

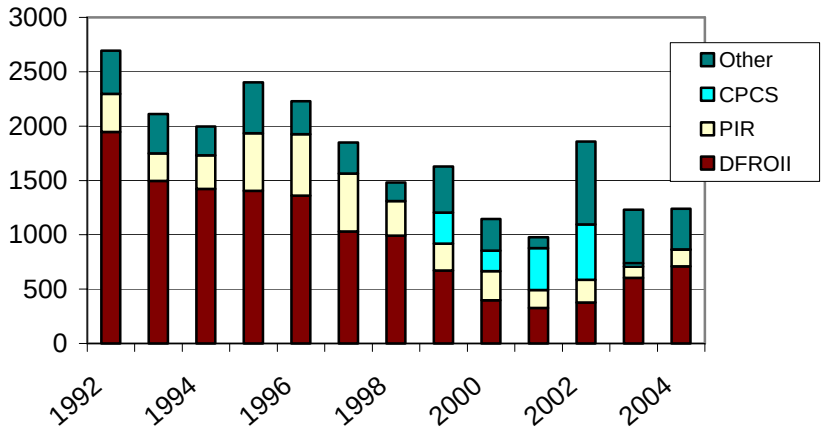
Of the 828 cases recognized as definitely, probably, or possibly related to pesticide exposure, 390 (47 percent) involved use of pesticides for agricultural purposes (i.e. intended to contribute to production of an agricultural commodity, including livestock) and 438 (53 percent) involved pesticide exposure in other situations, such as structural, sanitation, or home garden use, in the manufacturing process, or during storage. Evidence established a definite relationship to pesticide exposure for 126 (15 percent) of the 828 cases. Another 426 (51 percent) were classified as probable, with 276 (33 percent) entered as possible. Tabular summaries presenting different aspects of the data are available through DPR's Web site at www.cdpr.ca.gov/docs/dprdocs/pisp/2004pisp.htm, or by contacting the WH&S Branch.

Enforcement actions often are still under consideration when DPR receives the illness investigative reports, and identification of violations is difficult. Based on the information available at the time of evaluation, WH&S scientists concluded that factors already prohibited by pesticide safety regulations had contributed to 378 (46 percent) of the 828 cases evaluated as definitely, probably, or possibly related to pesticide exposure. This includes 199 people affected by apparent violations during or following agricultural pesticide use (51 percent of the 390 definite, probable, or possible agricultural cases). In circumstances other than agricultural use,

evaluators felt that violations contributed to 179 (41 percent) of the 438 definite, probable or possible cases. The non-agricultural violations included failure by 78 mixer/loader/applicators to use required protective equipment. An evaluation of the reasons for this failure to use protective equipment was not conducted. This indicates the importance of continuing compliance efforts to further reduce pesticide-related illnesses and injuries.

Occupational exposures (those that occurred while the affected people were at work) accounted for 757 (91 percent) of the 828 pesticide-associated cases from 2004. Occupational exposures typically predominate among the cases PISP collects. DPR has tried to develop supplementary methods for finding pesticide cases that doctors neglect to report, but at present DFROII review is the only such mechanism working consistently. Figure 3 shows that DFROII retrievals identify more cases than any other source. Consequently, occupational exposure surveillance is reasonably effective. Unless and until a comparable mechanism provides notification of non-occupational exposures, their frequency remains uncertain.

Figure 3: Mechanisms that Identified Cases for Investigation



DFROII – Doctor's First Report of Occupational Illnesses and Injury (Workers' Compensation document).
PIR – Pesticide Illness Report (physician reporting in compliance with Health and Safety Code105200).
CPCS – California Poison Control System (facilitated physician reporting).
Other – All other methods of case identification.

Figure 3 also shows that substantial numbers of cases continue to be identified by mechanisms outside the usual reporting pathways. This occurs because the usual reports come only from medical care providers. If affected people do not seek care, or if their doctors neglect to report the incident, CACs may still identify and investigate exposures. Particularly when groups of people are involved, such episodes come to CACs' attention via emergency response contacts, news reports, or direct citizen complaints. CACs also locate some additional cases in the course of investigating reported illnesses.

Agricultural Field Worker Incidents

In 2004, 269 cases of field worker illness or injury were evaluated as definitely, probably or possibly related to pesticide exposure (Figure 4). Sixty-eight of them (25 percent) were exposed to pesticide residue, and 180 (67 percent) were exposed to drift. Nineteen other workers may have been exposed to drift and/or residue when they transplanted tomato seedlings adjacent to a rice field that had been treated the day before and was treated again while they worked. One field worker was exposed when chlorinated water ricocheted into his eye during field packing of lettuce. Another field worker got sick after eating some grapes from the vineyard where he worked, forgetting he had seen them sprayed with oil the day before. The applicator had neglected to record this treatment on the data sheet the vineyard maintains for application-specific information. The vineyard was given a verbal warning for the failure.

One large drift episode, described in the drift exposure section of this report, gave rise to 122 of the 180 drift cases, and another drift episode affected 28 field workers. The other 30 field workers encountered drift in 11 separate episodes, eight of which affected just one person. Violations contributed to six episodes in which 130 field workers were definitely, probably or possibly affected by drift. Drift exposure definitely affected three workers, probably caused or contributed to symptoms experienced by 102 workers, and was a possible factor in 75 field worker cases. Among the 19 workers potentially exposed to both residue and drift, 16 were evaluated as probably related and three as possible.

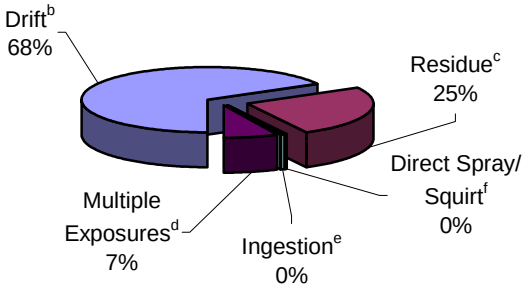
Sixteen of the 68 residue exposures were evaluated as probably related to reported health effects; the other 52 field worker residue exposures were evaluated as possibly related. Violation of

restricted entry intervals contributed to 18 residue cases, including three with additional safety violations.

One episode gave rise to ten of the illnesses associated with residue exposure and reentry violation: The morning after a night application with a 72-hour restricted entry interval, a packing crew equipment driver removed a field posting sign and entered the restricted field. Two harvesting crews began work later that day. They were removed when the error was discovered, and 33 of the workers went for medical examinations. Twenty-one of the 33 denied experiencing any ill effects, ten reported symptoms compatible with the exposure, and DPR did not receive information about two. The packing company was fined $3,000 for endangering their employees.

Six other reentry violation incidents affected eight other workers. Two of the workers were exposed in an episode that, in addition to early reentry, involved pesticide use on a site for which it was not labeled. Required decontamination facilities were not available to an irrigator who entered another restricted field.

Figure 4: Field Worker Exposure to Pesticides, 2004[a]

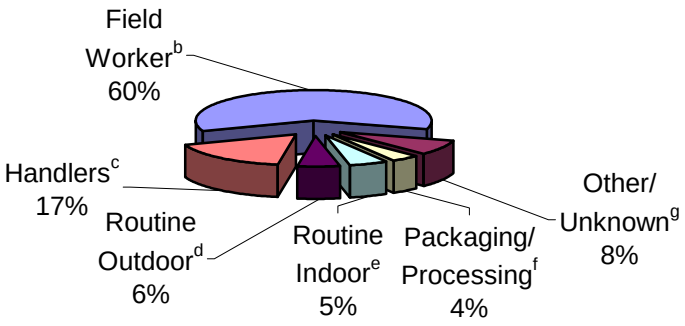


[a] Total field worker cases associated with pesticide exposure = 269.
[b] Drift refers to field worker cases associated with exposure to drift from a pesticide application.
[c] Residue refers to field worker cases associated with exposure to residue of previously applied pesticides.
[d] Multiple Exposures refers to contact with pesticides through two or more mechanisms.
[e] Ingestion refers to intentional or unintentional oral ingestion, including ingestion of residue on produce (as in this case).
[f] Direct Spray/Squirt refers to contact made when the pesticide is propelled from handling equipment (e.g., direct spray).

Drift Exposure

The PISP defines drift exposure as exposure to pesticide "spray, mist, fumes, or odor carried from the target site by air." This definition includes the offsite movement of pesticides after they have been deposited at the target site, so long as the application remains in progress. It also includes exposures of pesticide handlers in which air movement carried the pesticide and caused exposure. In 2004, DPR recorded a total of 301 individuals who reported symptoms definitely, probably, or possibly related to exposure to drift (Figure 5) in 96 separate episodes. Agricultural pesticide use was found responsible for 233 drift cases (77 percent), in 37 episodes. Other exposure situations accounted for 68 cases (23 percent) in 59 episodes.

Figure 5: Illnesses Associated with Pesticide Drift by Activity, 2004[a]



[a] Total drift cases for 2004 = 301.
[b] Field Workers are people working in agricultural fields at the time of drift exposure
[c] Handlers include people mixing, loading and applying pesticides, repairing pesticide equipment and flagging for aerial application.
[d] Routine Outdoor includes people outdoors (occupational and non-occupational) with little expectation of contacting pesticides (e.g., gardeners not handling pesticides, residents).
[e] Routine Indoor includes people in offices and businesses, residential structures, etc. (occupational and non-occupational) who were not handling pesticides.
[f] Packaging/Processing includes people involved in processing harvested crops.
[g] Other/Unknown – Any other type of activity or unknown activity.

A single episode accounted for 122 of the drift cases. Seven crews had spent an hour and a half picking peaches when a helicopter began applying pesticides to a potato field 0.2 miles away. WH&S scientists traveled to Kern County (Hernandez and Welsh, 2004) to collect foliage

samples and interview the workers. The peach harvesters said they had felt no mist from the aerial application, but they smelled a strong odor almost immediately. Of the 137 workers identified as present in the peach orchard, 14 denied any health effects and one provided no information. The other 122 reported symptoms compatible with the exposure. Four of them had symptoms so serious they were admitted to hospitals. The day after the event, WH&S scientists took foliage samples from the peach orchard, the treated potato field, and a plum orchard on the other side of the peach orchard. The potato samples confirmed that the organophosphate insecticide methamidophos had been applied there. Methamidophos was also found in two of four samples from the peach orchard, at levels one to four percent of the amount found on the potatoes. Both samples from the plum orchard were negative. This episode was referred to the county district attorney, who proposed a settlement of $60,000. The applicator contested it, and resolution is pending.

WH&S also helped to investigate an episode in which a nursery crew felt spray drift as well as smelling it (Hernandez, 2004). Three crew members developed headaches, and one vomited. In this case, samples were taken four days after the occurrence. Residues on the nursery stock ranged from one tenth of a percent of the level at the treated site to ten percent. The grower was fined $3,750 for allowing the drift to occur and for being unable to document the applicator's training. After reviewing the sample results, WH&S assured the nursery that the stock was safe to handle.

Apart from these two episodes, drift exposure was evaluated as definitely, probably, or possibly related to health effects reported by another 54 field workers, 12 workers handling agricultural products in the channels of trade, 16 people engaged in routine indoor activities when exposed, 17 people engaged in routine outdoor activities, and 24 people involved in activities not adequately described by any of the defined categories. Additionally, 52 pesticide handlers were definitely, probably, or possibly affected by airborne exposure to the pesticides they handled. Such exposures are recorded as drift. Of the 52 pesticide handlers exposed via drift, 12 worked in agriculture.

Morbidity and Mortality

Among the 552 cases evaluated as definitely or probably related to pesticide exposure, 12 people were admitted to hospitals and 95 lost time from work. Of the 276 possible cases, two reported hospitalization and 29 lost work time.

DPR investigated the deaths of two professional pesticide applicators in 2004, but found no basis for connecting either of the deaths to pesticide exposure. One of the men died in his sleep. His clothing and protective equipment were sampled extensively, but analysis detected only small amounts of pesticide, well below levels of toxicologic significance. The other was killed when he drove his tractor into a ditch after several weeks of working 12-hour shifts six days a week. During the month preceding his death, he had handled no pesticides likely to impair alertness or judgment.

No deaths from pesticide toxicity were identified, and no children are known to have suffered life-threatening illness from pesticide exposure in California in 2004.

Examples of the Importance of Safe Pesticide Practices

An extraordinarily severe example of pesticide misuse appears to have occurred in 2004. After a physician reported treating a worker for methyl bromide exposure, investigation indicated that the worker had been assigned to apply methyl bromide without adequate training, supervision, or protective equipment, that he was given poorly maintained and unsafe application equipment, that his complaints of exposure and illness were ignored, that the employer attempted to falsify records to obscure violations of pesticide safety laws and regulations, and that in consequence the worker appears to have suffered permanent injury. Criminal charges have been filed against supervisory personnel in this episode, the first California criminal prosecution for pesticide misuse since 1991.

Another significant episode occurred at a nursery where a worker entered a greenhouse just as an application ended. Such entry is illegal, and accounts differ as to whether the nursery had taken appropriate precautions to prevent it. Although the worker immediately left the treated

greenhouse, she had an asthma attack and was taken for care. At the time, her treatment seemed successful. She returned to work the next day, but four days later she entered the same greenhouse and began to have breathing problems again. That evening, she collapsed at home and needed intensive care to save her life. The case was reported by the doctor who treated her following the original exposure. He diagnosed allergy to the microbial insecticide, Bacillus thuringiensis (Bt) that had been sprayed in the greenhouse along with the organophosphate insecticide acephate. DPR arranged for testing by an academic expert. He found that blood tests did indeed suggest allergy to Bt; but when he tested the worker in person, she did not react to pesticide extract. Some aspect of her pesticide exposure, however, still seems the most probable cause of the sudden and severe exacerbation of a condition that had been under good control until that time.

Severe reactions are not limited to egregious misuse, however. The PISP received several reports of hospitalizations following sanitizer exposures that could happen in a variety of settings, both occupational and non-occupational. A dairy employee breathed fumes generated when he poured a sanitizer that contained bleach into a small spray bottle that turned out to contain an incompatible cleaning product. A school cafeteria worker began coughing and wheezing when she smelled the bleach-based sanitizer that a co-worker applied to the salad bar, and was hospitalized for pneumonia three days later. A nurse was hospitalized for five days to control the asthma exacerbation she suffered in apparent response to an odor at her workplace. (She encountered sanitizers there daily, so the problem may have come from a floor stripper in use at the time, or from the combination of sanitizer with floor stripper.) The first two cases involved using bleach for sanitation, and the third involved a combination of quaternary ammonium sanitizers that are widely used. In the latter two cases, the sanitizers were handled correctly. Sanitizers include some of the most hazardous pesticides still available for general use. These cases illustrate the importance of handling them with respect.

DPR also learned of five people hospitalized after swallowing pesticides in apparent suicide attempts. All five people recovered. Technically, ingesting pesticide violates label instructions and consequently violates state and federal law, but enforcement efforts could scarcely address this sort of violation. More practically, enforcement can be directed towards limiting availability

of highly toxic pesticides. For this reason, investigators focus on identifying the sources and storage of pesticides misused for suicides or suicide attempts. DPR instructs investigators to respect the privacy of families in such difficult circumstances, but encourages them to pursue the dealers or permittees who supply dangerous products to untrained consumers.

References

DPR 2004. Summary of the Results from the California Pesticide Illness Surveillance Program, 2003. California Environmental Protection Agency, Department of Pesticide Regulation, Worker Health and Safety Branch. Report No. HS-1857 (http://www.cdpr.ca.gov/docs/whs/pdf/hs1857.pdf)

Fong, H. 2004. Consultation on Woolf-Harris Facility and Their Use of Phosphine Gas. Cited Memo No. HSM-04032

Hernandez, B. 2004. Project 0406 - Propargite/Esfenvalerate Drift Incident In Madera County. Cited Memo No. HSM-04025

Hernandez, B. and A. Welsh 2004. Project 0405 - Worker Health & Safety Activities Following Methamidophos Drift Incident In Kern County (16-KER-04). Cited Memo No. HSM-04024

McCarthy, S. 2004. Summary of 2000-2002 Early Entry Episodes. Cited Memo No. HSM-04026

Summary of Illness/Injury Incidents
Reported in California as Potentially Related to Pesticide Exposure
Summarized Statewide and by County of Occurrence[1]
2004

Relationship[2]	Total Cases	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
TOTALS							
Definite	126	109	9	1	7	13	113
Probable	426	93	188	60	85	200	226
Possible	276	18	104	84	70	177	99
Unlikely	46	1	17	15	13	35	11
Indirect	8	0	0	6	2	0	8
Asymptomatic	74	3	36	25	10	61	13
Unrelated	186						
Insufficient	13						
Unavailable	83						
OVERALL	**1238**	**224**	**354**	**191**	**187**	**486**	**470**
COUNTY[5]							
ALAMEDA							
Definite	3	3	0	0	0	0	3
Probable	7	2	0	1	4	0	7
Possible	6	2	1	1	2	0	6
Unlikely	2	0	0	0	2	1	1
Unrelated	2						
Unavailable	5						
BUTTE							
Probable	6	0	2	1	3	3	3
Possible	2	0	0	0	2	0	2
Unrelated	1						
CALAVERAS							
Probable	1	0	0	1	0	0	1
Unrelated	1						
COLUSA							
Possible	2	0	0	2	0	1	1
Unrelated	2						

Relationship[2]	Total Cases	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
CONTRA COSTA							
Definite	1	1	0	0	0	0	1
Probable	2	2	0	0	0	0	2
Possible	3	1	0	0	2	0	3
Unlikely	1	0	0	0	1	0	1
Unrelated	2						
Unavailable	1						
DEL NORTE							
Unrelated	1						
EL DORADO							
Probable	3	0	3	0	0	3	0
FRESNO							
Definite	3	2	0	0	1	0	3
Probable	42	6	20	10	6	31	11
Possible	19	0	3	13	3	11	8
Asymptomatic	4	0	0	2	2	4	0
Unrelated	8						
Insufficient	2						
GLENN							
Possible	1	0	0	0	1	1	0
Unrelated	1						
HUMBOLDT							
Definite	1	1	0	0	0	0	1
Unavailable	2						
IMPERIAL							
Definite	1	1	0	0	0	0	1
Probable	5	0	4	0	1	5	0
Unrelated	3						
Unavailable	3						
KERN							
Definite	7	4	3	0	0	3	4
Probable	111	6	100	1	4	99	12
Possible	60	0	28	24	8	58	2
Unlikely	5	0	0	2	3	4	1
Asymptomatic	17	1	15	1	0	16	1
Unrelated	14						
Unavailable	5						

Relationship[2]	Total Cases	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
KINGS							
Unrelated	3						
LAKE							
Probable	1	0	1	0	0	0	1
Possible	1	0	0	1	0	1	0
Unrelated	1						
Unavailable	1						
LASSEN							
Definite	1	1	0	0	0	0	1
LOS ANGELES							
Definite	28	24	0	0	4	1	27
Probable	48	15	16	9	8	0	48
Possible	16	2	1	7	6	0	16
Unlikely	1	0	0	1	0	0	1
Indirect	1	0	0	1	0	0	1
Asymptomatic	4	0	1	0	3	0	4
Unrelated	35						
Insufficient	3						
Unavailable	24						
MADERA							
Definite	1	1	0	0	0	0	1
Probable	3	1	1	1	0	3	0
Possible	5	0	3	1	1	5	0
Unlikely	1	0	0	1	0	1	0
Asymptomatic	5	0	5	0	0	5	0
Unrelated	3						
MARIN							
Definite	1	1	0	0	0	0	1
Probable	2	1	1	0	0	0	2
Possible	1	0	0	1	0	0	1
Unrelated	3						
Unavailable	1						
MARIPOSA							
Unavailable	1						
MENDOCINO							
Definite	2	2	0	0	0	0	2
Possible	2	0	0	0	2	0	2
Unrelated	1						

Relationship[2]	Total Cases	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
MERCED							
Definite	4	3	1	0	0	3	1
Probable	10	1	0	8	1	2	8
Possible	7	2	1	3	1	3	4
Unlikely	1	0	0	1	0	1	0
Asymptomatic	1	0	0	1	0	0	1
Unrelated	8						
MONTEREY							
Definite	6	5	1	0	0	2	4
Probable	25	3	11	11	0	23	2
Possible	57	0	48	8	1	57	0
Unlikely	18	0	16	1	1	17	1
Asymptomatic	34	0	13	21	0	34	0
Unrelated	3						
Insufficient	2						
Unavailable	6						
NAPA							
Probable	7	3	3	1	0	2	5
Possible	7	1	3	1	2	3	4
Asymptomatic	2	0	2	0	0	0	2
Unrelated	4						
Unavailable	1						
NEVADA							
Definite	1	1	0	0	0	0	1
ORANGE							
Definite	3	3	0	0	0	0	3
Probable	8	1	0	0	7	0	8
Possible	6	0	2	1	3	0	6
Indirect	1	0	0	0	1	0	1
Unrelated	7						
Unavailable	4						
PLACER							
Unrelated	1						

Relationship[2]	Total Cases	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
RIVERSIDE							
Definite	4	3	0	0	1	0	4
Probable	8	3	2	1	2	1	7
Possible	4	0	1	1	2	0	4
Unrelated	8						
Unavailable	2						
SACRAMENTO							
Definite	4	3	0	1	0	0	4
Probable	3	2	1	0	0	0	3
Possible	4	0	1	0	3	1	3
Unlikely	1	0	1	0	0	0	1
Unrelated	3						
Unavailable	3						
SAN BENITO							
Possible	1	0	1	0	0	1	0
Unrelated	1						
SAN BERNARDINO							
Definite	9	8	1	0	0	0	9
Probable	29	3	2	1	23	0	29
Possible	7	2	0	1	4	0	7
Unrelated	15						
Insufficient	1						
SAN DIEGO							
Definite	12	11	0	0	1	0	12
Probable	20	12	3	2	3	2	18
Possible	8	2	2	3	1	2	6
Unlikely	2	0	0	2	0	1	1
Indirect	5	0	0	5	0	0	5
Asymptomatic	1	1	0	0	0	0	1
Unrelated	14						
Unavailable	7						
SAN FRANCISCO							
Definite	1	0	1	0	0	0	1
Probable	2	1	0	0	1	0	2
Possible	2	0	1	0	1	0	2
Unrelated	2						
Insufficient	3						

Relationship[2]	Total Cases	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
SAN JOAQUIN							
Definite	8	7	1	0	0	0	8
Probable	20	13	3	2	2	3	17
Possible	10	2	2	2	4	6	4
Unlikely	7	0	0	5	2	7	0
Asymptomatic	2	1	0	0	1	1	1
Unrelated	15						
Unavailable	2						
SAN MATEO							
Probable	2	2	0	0	0	0	2
Possible	1	0	0	0	1	0	1
Asymptomatic	1	0	0	0	1	0	1
Unrelated	2						
Unavailable	1						
SANTA BARBARA							
Probable	1	1	0	0	0	1	0
Possible	2	0	0	1	1	1	1
Unlikely	1	0	0	0	1	1	0
Indirect	1	0	0	0	1	0	1
Unavailable	1						
SANTA CLARA							
Definite	4	4	0	0	0	0	4
Probable	5	2	3	0	0	0	5
Possible	4	1	0	0	3	0	4
Unrelated	6						
Unavailable	2						
SANTA CRUZ							
Definite	1	1	0	0	0	0	1
Unlikely	1	0	0	0	1	0	1
Unrelated	1						
SHASTA							
Possible	2	1	0	1	0	1	1
Unrelated	2						
Insufficient	1						
SISKIYOU							
Probable	1	0	1	0	0	0	1
Possible	1	0	0	1	0	1	0
Unavailable	1						

Relationship[2]	Total Cases	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
SOLANO							
Definite	1	1	0	0	0	0	1
Probable	4	1	3	0	0	0	4
Unrelated	1						
Unavailable	2						
SONOMA							
Definite	4	4	0	0	0	0	4
Probable	6	4	1	1	0	0	6
Possible	4	0	0	1	3	3	1
Unlikely	2	0	0	1	1	1	1
Asymptomatic	1	0	0	0	1	0	1
Unrelated	3						
Unavailable	2						
STANISLAUS							
Definite	6	6	0	0	0	2	4
Probable	10	0	2	5	3	4	6
Possible	10	2	0	3	5	3	7
Unlikely	1	0	0	1	0	0	1
Unrelated	7						
Unavailable	1						
SUTTER							
Probable	18	0	2	0	16	16	2
Possible	3	0	0	0	3	3	0
Asymptomatic	1	0	0	0	1	1	0
Unrelated	1						
Unavailable	1						
TEHAMA							
Definite	1	1	0	0	0	1	0
Unlikely	1	1	0	0	0	1	0
TULARE							
Definite	3	2	1	0	0	0	3
Probable	7	4	1	1	1	2	5
Possible	14	0	5	6	3	14	0

Relationship[2]	Total Cases	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
VENTURA							
Definite	2	2	0	0	0	1	1
Probable	7	2	2	3	0	0	7
Possible	1	0	0	0	1	0	1
Insufficient	1						
Unavailable	4						
YOLO							
Definite	3	3	0	0	0	0	3
Probable	2	2	0	0	0	0	2
Possible	3	0	1	1	1	1	2
Unlikely	1	0	0	0	1	0	1
Asymptomatic	1	0	0	0	1	0	1
Unrelated	1						

1. **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program.
   The term "potentially related to pesticide exposure" refers to all cases reported to the program, some of which were later determined to be unrelated to pesticide exposure.

2. **Relationship:** Degree of correlation between pesticide exposure and resulting symptomatology.

   Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

   Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

   Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

   Unlikely : A correlation cannot be ruled out absolutely. Medical and/or physical evidence suggest a cause other than pesticide exposure.

   Indirect : Pesticide exposure is not responsible, but pesticide regulations or product label requirements contributed in some way, (e.g. heat stress while wearing chemical resistant clothing).

   Asymptomatic : Exposure occurred, but did not result in illness/injury. Cholinesterase depression without symptoms falls in this category.

   Unrelated : Definite evidence of cause other than pesticide exposure including exposures to chemicals other than pesticides. Since there is no exposure to pesticides, there are no entries under "Type of Exposure" or "Intended Use."

Insufficient : The available information is inadequate to make an informed judgment on the relationship between pesticide exposure and the reported symptomatology. For submitted investigations, the investigator failed to make an adequate attempt to obtain the necessary information. Since a relationship to pesticide exposure cannot be determined, there are no entries under "Type of Exposure" or "Intended Use."

Unavailable : The available information is inadequate to make an informed judgement on the relationship between pesticide exposure and the reported symptomatology. For submitted investigations, the investigator made an adequate attempt to collect the necessary information, but was not able to do so (e.g., none of the parties concerned could be contacted). Since a relationship to pesticide exposure cannot be determined, there are no entries under "Type of Exposure" or "Intended Use."

3. **Type of Exposure:** Characterization of how an individual came in contact with a pesticide.

Direct Contact : An appreciable amount of pesticide contacted the individual's body surface. This includes: 1) sprays or squirts from application equipment; 2) leaks or spills whether or not related to the application; and 3) deliberate immersion (as when cleaning implements in a basin with antimicrobials). This excludes drift exposures.

Drift : Spray, mist, fumes, or odor carried from the target site by air. Drift must be related to an application or mix/load activity.

Residue : The part of a pesticide that remains in the environment for a period of time following an application or drift. This includes odor after the completion of an application.

Other/Unknown : Any of the following: 1) ingestion; 2) multiple routes of exposure; 3) residue from a spill; 4) exposure to smoke or pyrolitic products from a fire where pesticides are burning; 5) route of exposure is not known.

4. **Intended Use:** Agricultural/Non-Agricultural - Indicates whether the pesticide(s) were intended to contribute to the production of agricultural commodities.

Agricultural : The pesticide(s) were intended to contribute to the production of agricultural commodities, including livestock. This includes: 1) agricultural research facilities, 2) handling of raw agricultural commodities in packing houses, 3) drift from agricultural applications into non-agricultural areas, and 4) transportation and storage of pesticides on farm lands. It excludes forestry operations, although they are classified as agricultural for regulatory purposes. It also excludes manufacture, transportation, and storage of pesticides prior to arrival at the site of agricultural production.

Non-Agricultural : The pesticide(s) were not intended to contribute to the production of agricultural commodities. This includes: 1) residential pesticide uses, 2) structural pest control, 3) rights-of-way, 4) parks, 5) landscaped urban areas, and 6) manufacture, transportation and storage of pesticides except on farm lands.

5. **County:** Individual counties in California where the incident occurred. If a county is not listed, there were no reported illnesses for that county for the year.

Whom to Contact:

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Worker Health and Safety Branch
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About the Pesticide Illness Surveillance Program Data

Pesticide-related illnesses have been tracked within the state of California for more than 50 years. The California Environmental Protection Agency, Department of Pesticide Regulation (DPR) maintains a surveillance program which records human health effects of pesticide exposure. The Pesticide Illness Surveillance Program (PISP) documents information on adverse effects from pesticide products, whether elicited by the active ingredients, inert ingredients, impurities, or breakdown products. This program maintains a database, which is utilized for evaluating the circumstances of pesticide exposures resulting in illness. This database is consulted regularly by staff who evaluate(s) the effectiveness of the DPR pesticide safety programs and recommend changes when appropriate.

Cases Reported in California[1] with Documented[2] Pesticide Exposure Summarized by the Type of Illness and the Type of Pesticides 2004

Type of Illness[3]	Antimicrobials[4]		Cholinesterase Inhibitors[4]		Other Pesticides[4]		Total
	Occupational[5]	Non-Occupational[5]	Occupational[5]	Non-Occupational[5]	Occupational[5]	Non-Occupational[5]	
Systemic							
Systemic Only	9	0	84	24	69	7	**193**
Systemic with Respiratory and Topical Effects	17	0	15	2	16	3	**53**
Systemic with Respiratory Effects	23	4	47	6	51	8	**139**
Systemic with Topical Effects	2	0	18	0	27	4	**51**
Respiratory							
Respiratory Only	17	1	9	2	16	5	**50**
Respiratory with Topical Effects	9	0	1	0	7	1	**18**
Topical							
Eye Only	139	0	3	1	33	2	**178**
Skin Only	71	1	5	0	48	0	**125**
Eye and Skin	11	0	0	0	9	0	**20**
Asymptomatic							
Asymptomatic	4	0	41	0	26	3	**74**
Unknown							
Unknown	0	0	0	0	1	0	**1**
TOTAL	**302**	**6**	**223**	**35**	**303**	**33**	**902**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program.

[2] **Documented Pesticide Exposure:** Includes cases classified as definitely, probably, or possibly related to pesticide exposure as well as documented pesticide exposure that did not result in symptomatology.

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Type of Illness:** Categorization of the type of symptoms experienced.

Systemic : Any health effects not limited to the respiratory, skin and/or eye. Cases involving multiple illness symptom types including systemic symptoms are included in the systemic category.

Respiratory : Health effects involving any part of the respiratory tree.

Topical : Health effects involving only the eyes and/or skin. This excludes outward physical signs (miosis and lacrimation) related to effects on internal bodily systems. These signs are classified under 'Systemic.'

Asymptomatic : Exposure occurred, but did not result in illness/injury. Cholinesterase depression without symptoms falls in this category.

[4] **Type of Pesticide:** Type of pesticide based on functional class.

Antimicrobials : Pesticides used to kill or inactivate microbiological organisms (bacteria, viruses, etc.).

Cholinesterase Inhibitors : Pesticides known to inhibit the function of the cholinesterase enzyme.

Other Pesticides : Any pesticide that is not an antimicrobial or cholinesterase-inhibiting pesticide.

[5] **Occupational or Non-Occupational:** The relationship between the illness/injury and the individual's work

Occupational	: Work related. The individual was on the job at the time of the incident. This includes both paid employees and volunteers working in similar capacity to paid employees.
Non-Occupational	: Not work related. The individual was not on the job at the time of the incident. This category includes individuals on the way to or from work (before the start or after the end of their workday).

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Illnesses and Injuries Reported in California[1] Associated With[2] Pesticide Exposure Summarized by the Type of Activity and Type of Exposure 2004

Occupational[3]

Type of Activity[4]	Type of Exposure[5]								Total
	Drift	Residue	Direct Spray/ Squirt	Spill/ Other Direct	Ingestion	Multiple	Other	Unknown	
Mixer/Loader	10	0	8	50	0	0	0	3	71
Applicator	36	0	25	86	0	4	6	39	196
Mechanical	3	2	4	10	0	0	3	1	23
Packaging/Processing	12	11	0	0	0	3	5	0	31
Field Worker	180	68	1	0	1	19	0	0	269
Routine Indoor	11	28	0	2	3	2	12	2	60
Routine Outdoor	14	2	2	1	0	1	1	1	22
Manufacturing/Formulation	0	0	0	2	0	0	2	1	5
Transport/Storage/Disposal	0	0	4	8	0	0	3	2	17
Emergency Response	0	1	0	0	0	0	1	0	2
Other	12	18	7	9	2	1	9	2	60
Unknown	0	0	0	1	0	0	0	0	1
Total Occupational Cases	***278***	***130***	***51***	***169***	***6***	***30***	***42***	***51***	***757***

Non-Occupational[3]

Type of Activity[4]	Type of Exposure[5]								Total
	Drift	Residue	Direct Spray/ Squirt	Spill/ Other Direct	Ingestion	Multiple	Other	Unknown	
Applicator	3	0	0	0	0	0	0	1	4
Routine Indoor	5	12	0	0	1	1	23	0	42
Routine Outdoor	3	2	1	0	0	0	1	0	7
Other	12	1	0	0	3	2	0	0	18
Total Non-Occupational Cases	***23***	***15***	***1***	***0***	***4***	***3***	***24***	***1***	***71***
Total Occupational/ Non-Occupational	**301**	**145**	**52**	**169**	**10**	**33**	**66**	**52**	**828**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program.

[2] **Associated With:** Includes cases classified as definitely, probably or possibly related to pesticide exposure

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Occupational Status:** Occupational or Non-Occupational

Occupational : Work related. The individual was on the job at the time of the incident. This includes both paid employees and volunteers working in similar capacity to paid employees.

Non-Occupational : Not work related. The individual was not on the job at the time of the incident. This category includes individuals on the way to or from work (before the start or after the end of their workday).

[4] **Type of Activity:** Activity of the injured individual at the time of exposure

Mixer/Loader	:	Mixes and/or loads pesticides. This includes: (1) removing a pesticide from its original container, (2) transferring the pesticide to a mixing or holding tank, (3) mixing pesticides prior to application, (4) driving a nurse rig, or (5) transferring the pesticide from a mix/holding tank or nurse rig to an application tank.
Applicator	:	Applies pesticides by any method or conducts activities considered ancillary to the application (e.g., cleans spray nozzles in the field).
Mechanical	:	Maintains (e.g. cleans, repairs or conducts maintenance) pesticide contaminated equipment used to mix, load or apply pesticides as well as the protective equipment used by individuals involved in such activities. This excludes the following: 1) maintenance performed by applicators on their equipment incidental to the application; 2) maintenance performed by mixer/loaders on their equipment incidental to mixing and loading; 3) decontamination by HAZMAT teams.
Packaging/Processing	:	Handles (packs, processes or retails agricultural commodities from the packing house to the final market place. Field packing of agricultural commodities is classified as field worker.
Field Worker	:	Works in an agricultural field performing tasks such as advising, scouting, harvesting, thinning, irrigating, driving tractor (except as part of an application), field packing, conducting cultural work in a greenhouse, etc. Researchers performing similar tasks in an agricultural field are also included.
Routine Indoor	:	Conducts activities in an indoor environment with minimal expectation for exposure to pesticides. This includes people in offices and businesses, residential structures, etc. who are not handling pesticides.
Routine Outdoor	:	Conducts activities in an outdoor environment with minimal expectation for exposure to pesticides. This excludes field workers in agricultural fields. This includes gardeners who are not handling pesticides.
Manufacturing and Formulation	:	Manufactures, processes or packages pesticides. This includes "mixing" if it is done in a plant for application elsewhere.
Transport/ Storage/ Disposal	:	Transports or stores pesticides between packaging and preparation for use. This includes shipping, warehousing and retailing as well as storage by the end-user prior to preparation for use. Disposal of unused pesticides is also included in this activity. This excludes driving a nurse rig to an application site.
Emergency Response	:	Emergency Response Personnel (police, fire, ambulance and HAZMAT personnel) responding to a fire, spill, accident or any other pesticide incident in the line of duty.
Other	:	Activity is not adequately described by any other activity category. This includes but is not limited to: 1) being inside a vehicle; 2) dog groomers not handling pesticides; 3) individuals handling pesticide treated wood; 4) two or more activities with potential for pesticide exposure.
Unknown	:	Activity is not known

[5] **Type of Exposure:** Characterization of how an individual came in contact with a pesticide.

Drift	: Spray, mist, fumes, or odor carried from the target site by air. Drift must be related to an application or mix/load activity.
Residue	: The part of a pesticide that remains in the environment for a period of time following an application or drift. This includes odor after the completion of an application.
Direct Spray/Squirt	: Material propelled by the application or mix/load equipment. Contact with the material can be by direct projection or ricochet. This includes exposure of mechanics working on application or mix/load equipment when the material is forced out by pressure.
Spill/Other Direct	: Any of the following: 1) Contact made during an application or mixing/loading operation where the material is not propelled by the equipment; 2) Expected direct contact during use (e.g. washing dishes in a disinfectant solution); 3) Leaks, spills, etc. not related to an application.
Ingestion	: Intentional or unintentional oral ingestion.
Multiple	: Contact with pesticides occurred through two or more mechanisms.
Other	: Other known route of exposure not included in other exposure categories. This includes, but not limited to: 1) Residue from a spill and 2) Exposure to smoke or pyrolitic products from a fire where pesticides are burning.
Unknown	: Route of exposure is not known.

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Illnesses and Injuries Reported by California Physicians[1] Associated With[2] Pesticide Exposure Summarized by Pesticide(s) and Type of Illness 2004

Pesticide[3]	Systemic/ Respiratory[4]		Topical[4]		TOTAL	
	Definite/ Probable	Possible	Definite/ Probable	Possible	Definite/ Probable	Possible
Organophosphates						
Acephate	1	0	0	0	1	0
Bensulide	0	0	0	1	0	1
Chlorpyrifos	0	0	1	0	1	0
DDVP	0	1	0	0	0	1
Diazinon	2	0	0	0	2	0
Malathion	29	1	0	0	29	1
Methamidophos	97	26	0	1	97	27
Mevinphos	0	1	0	0	0	1
N-Methyl Carbamates						
Methomyl	0	1	0	0	0	1
Oxamyl	0	1	0	0	0	1
Propoxur	0	1	0	0	0	1
Pyrethrins and Pyrethroids						
Bifenthrin	1	0	0	0	1	0
Cyfluthrin	1	6	1	0	2	6
Cyhalothrin	2	0	0	0	2	0
Cypermethrin	0	1	2	0	2	1
Deltamethrin	2	2	0	0	2	2
Esfenvalerate	1	1	0	1	1	2
Fenpropathrin	1	0	0	0	1	0
Permethrin	0	1	0	0	0	1
Other Pesticides						
Abamectin	0	1	0	0	0	1
Aluminum Phosphide	2	0	0	0	2	0
Bifenazate	0	0	1	0	1	0
Boric Acid	0	0	0	1	0	1
Calcium Hypochlorite	1	0	2	0	3	0
Captan	2	0	1	0	3	0
Chlorine	2	0	1	0	3	0
Chlorothalonil	0	0	2	0	2	0
Copper Naphthenate	0	0	0	1	0	1
Creosote	0	0	0	1	0	1
Cryolite	1	0	0	0	1	0

Pesticide[3]	Systemic/ Respiratory[4]		Topical[4]		TOTAL	
	Definite/ Probable	Possible	Definite/ Probable	Possible	Definite/ Probable	Possible
Cyanuric Acid	2	1	6	3	8	4
DEET	0	1	0	0	0	1
Dichlobenil	0	0	1	0	1	0
Disodium Octaborate Tetrahydrate	1	0	0	0	1	0
Fludioxonil	0	0	0	2	0	2
Glutaraldehyde	9	2	5	0	14	2
Glyphosate	2	7	7	1	9	8
Hydrogen Chloride	2	0	5	0	7	0
Hydrogen Cyanamide	0	0	0	1	0	1
Hydrogen Peroxide	0	0	0	1	0	1
Imidacloprid	0	1	0	1	0	2
Kathon	0	0	1	0	1	0
Lime-Sulfur	0	0	2	0	2	0
Magnesium Phosphide	2	0	0	0	2	0
Metam-Sodium	0	1	3	1	3	2
Methyl Bromide	2	1	2	0	4	1
Neem Oil	1	0	0	0	1	0
Oil of Peppermint	1	0	0	0	1	0
Oxyfluorfen	0	1	0	0	0	1
Ozone	2	0	0	0	2	0
Para-Dichlorobenzene	0	3	0	0	0	3
Paraquat	0	0	1	1	1	1
Pendimethalin	0	1	0	0	0	1
Peroxyacetic Acid	0	0	1	0	1	0
Petroleum Distillates	0	1	0	0	0	1
Petroleum Oil	0	0	0	1	0	1
Phenolic Disinfectants	1	0	5	1	6	1
Phosphine	13	0	0	1	13	1
Phosphoric Acid	1	0	0	0	1	0
Phthalaldehyde	0	0	2	0	2	0
Pine Oil	0	0	1	0	1	0
Pronamide	0	1	0	0	0	1
Propargite	0	0	0	1	0	1
Propiconazole	0	0	1	0	1	0
Pyriproxyfen	0	1	0	0	0	1
Quaternary Ammonia	2	2	57	9	59	11
Rimsulfuron	0	0	0	1	0	1
Sodium Chlorite	1	0	2	0	3	0
Sodium Hypochlorite	37	3	76	8	113	11

Pesticide[3]	Systemic/ Respiratory[4]		Topical[4]		TOTAL	
	Definite/ Probable	Possible	Definite/ Probable	Possible	Definite/ Probable	Possible
Sodium Tetrathiocarbonate	0	0	1	0	1	0
Spinosad	0	1	0	0	0	1
Sulfur	0	3	3	7	3	10
Sulfur Dioxide	1	1	0	0	1	1
Sulfuryl Fluoride	0	0	1	0	1	0
Trichloromelamine	0	0	2	1	2	1
Triclopyr	2	1	0	0	2	1
Combinations of Antimicrobials	7	4	26	6	33	10
Combinations of Fumigants	0	0	0	1	0	1
Combinations of Fungicides	2	1	1	6	3	7
Combinations of Herbicides	22	7	5	2	27	10
Combinations of Insecticides Including ChE Inhibitor(s)	2	13	2	1	4	14
Combinations of Insecticides Without ChE Inhibitor(s)	11	57	3	3	14	60
Miscellaneous Combinations	34	28	5	10	39	38
Unknown Antimicrobials	0	3	1	1	1	4
Unknown Herbicides	0	1	0	0	0	1
Unknown Insecticides	4	3	3	1	7	4
Unknown Pesticides	1	0	0	3	1	3
TOTAL	**310**	**194**	**242**	**81**	**552**	**276**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program.

[2] **Associated With:** Includes cases classified as definitely, probably or possibly related to pesticide exposure

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Type of Pesticide:** Pesticides listed on this table are grouped according to frequent inquiries received by DPR. Other pesticides are then listed in alphabetical order.

[4] **Type of Illness:** Categorization of the type of symptoms experienced.

Systemic	:	Any health effects not limited to the skin and/or eye. Cases involving multiple illness symptom types including systemic symptoms are included in the systemic category.
Respiratory	:	Health effects involving any part of the respiratory tree.
Topical	:	Health effects involving only the eyes and/or skin. This excludes outward physical signs (miosis and lacrimation) related to effects on internal bodily systems. These signs are classified under Systemic.

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About the Pesticide Illness Surveillance Program Data

Pesticide-related illnesses have been tracked within the state of California for more than 50 years. The California Environmental Protection Agency, Department of Pesticide Regulation (DPR) maintains a surveillance program which records human health effects of pesticide exposure. The Pesticide Illness Surveillance Program (PISP) documents information on adverse effects from pesticide products, whether elicited by the active ingredients, inert ingredients, impurities, or breakdown products. This program maintains a database, which is utilized for evaluating the circumstances of pesticide exposures resulting in illness. This database is consulted regularly by staff who evaluate(s) the effectiveness of the DPR pesticide safety programs and recommend changes when appropriate.

Summary of Cases Reported by California[1] as Associated With[2] Pesticide Exposure Summarized by Occupational Status and by Location of the Incident, 2004

Incident Setting[3]	Occupational Exposures[4]		Non-Occupational Exposures[4]		TOTAL	TOTAL
	Definite/ Probable[2]	Possible[2]	Definite/ Probable[2]	Possible[2]	Definite/ Probable[2]	Possible[2]
Farm	164	157	0	0	**164**	**157**
Nursery	4	5	0	0	**4**	**5**
Forest	0	1	0	0	**0**	**1**
Livestock Production Facility	6	1	0	0	**6**	**1**
Crop/Livestock Processing Facility	53	10	0	0	**53**	**10**
Animal Premise (Veterinary Hospital, Kennels, not Livestock)	5	1	0	0	**5**	**1**
Single Family Home	8	8	14	8	**22**	**16**
Multi-Unit Housing	7	2	4	1	**11**	**3**
Residential Institution	8	1	0	0	**8**	**1**
School	24	4	25	0	**49**	**4**
Prison	2	0	0	0	**2**	**0**
Hospital/Medical	45	12	0	0	**45**	**12**
Pesticide Manufacturing Facility	4	1	0	0	**4**	**1**
Industrial or Other Manufacturing Facility	11	10	0	0	**11**	**10**
Office/Business	13	5	0	0	**13**	**5**
Retail Establishment	13	8	0	0	**13**	**8**
Service Establishment	85	19	1	4	**86**	**23**
Wholesale Establishment	5	1	0	0	**5**	**1**
Road/Rail or Utility Right-of-Way	4	5	13	0	**17**	**5**
Park	10	1	0	0	**10**	**1**
Golf Course	1	1	0	0	**1**	**1**
Landscape, Other	2	4	0	0	**2**	**4**
Other (Locations other than those Described)	9	1	0	1	**9**	**2**
Unknown	12	4	0	0	**12**	**4**
TOTAL	**495**	**262**	**57**	**14**	**552**	**276**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness and Surveillance Program.

[2] **Associated With:** Includes cases classified as definitely, probably or possibly related to pesticide exposure

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Incident Setting:** Location where the incident occurred. The location may not coincide with the application site.

Farm	: Areas where agricultural crops are grown. This excludes the following: 1) nurseries and greenhouses which are classified under NURSERY; 2) livestock and poultry farms; and 3) forestry operations.
Nursery	: Facilities (including greenhouses) growing and selling plants, bulbs, seeds, etc. This includes the production of seedlings for transplanting into agricultural fields or forests.
Forest	: Establishments engaged in the operation of timber tracts, tree farms, reforestation projects and other forest related activities. This excludes forest nurseries growing seedlings for reforestation projects.
Livestock Production Facility	: Ranches, dairies, feedlots, egg production facilities, hatcheries and other establishments involved in keeping, grazing or feeding livestock or poultry for the sale of them or their products. This includes veterinary services provided for livestock.
Crop/Livestock Processing Facility	: Facilities involved in packing, manufacturing or processing foods or beverages for human consumption and feed products for animals and fowl. This includes facilities that sort, grade and pack fresh fruits and vegetables.
Animal Premise (Veterinary Hospital, Kennels, Not Livestock)	: Veterinary services, animal kennels**,** animal control facilities, dog grooming facilities and other services provided for companion animals. This excludes livestock.
Single Family Home	: The house and other structures on property intended for use by a single family. This includes swimming pools, but excludes landscaped areas on the property.
Multi-Unit Housing	: Apartments and multi-plexes and other buildings on property. This includes swimming pools, but excludes landscaped areas on the property.
Residential Institution	: Dormitories, nursing homes, homeless shelters and similar facilities.
School	: Establishments that provide academic or technical instruction. This includes daycare centers.
Prison	: Establishments for the confinement and correction of offenders as ordered by courts of law. This includes California youth authority facilities.

Hospital / Medical	: Establishments that provide medical, surgical and other health services to people. This includes offices and clinics of doctors and dentists, hospitals, medical and dental laboratories, kidney dialysis centers and other health related facilities.
Pesticide Manufacturing Facility	: Facilities engaged in manufacture and/or formulation of pesticides.
Industrial Or Other Manufacturing Facility	: Facilities involved in the mechanical or chemical transformations of materials or substances into new products. This excludes: 1) facilities engaged in manufacture or formulation of pesticides; and 2) facilities engaged in treatment of wood to protect against pest damage.
Office/Business	: Commercial establishments including public and private business offices. This excludes retail establishments and service establishments.
Retail Establishment	: Businesses engaged in selling merchandise for personal or household consumption and providing services related to the products. This excludes restaurants which are classified under service establishment.
Service Establishment	: Establishments engaged in providing services to individuals, businesses and government. This includes restaurants, laundries, etc. This excludes medical service establishments.
Wholesale Establishment	: Establishments involved in the distribution of merchandise to retail establishments or other wholesale establishments. This excludes "wholesalers" who sell directly to the public.
Road/Rail Or Utility Right Of Way	: Roads, rails or utilities and adjacent right-of-way areas. This includes aqueducts, manholes, landscaped median strips and vehicles moving along roadways.
Park	: An area of public land set aside for recreation. This includes public swimming pool facilities**.** This excludes private recreational facilities such as amusement parks, physical fitness facilities, etc. which are classified under service establishment.
Golf Course	: Land used for playing or practicing golf, including putting greens and driving ranges. This excludes miniature golf courses.
Landscape, Other	: Landscaped ornamental shrub and tree areas. This excludes ornamental shrub and tree areas in the following locations: 1) road/rail or utility right-of-ways; 2) parks; and 3) golf courses.
Other	: Location of exposure occurred at a site not adequately described in any other incident setting category. This includes, but is not limited to, telephone poles, fences, water supply systems and wastewater treatment plants.
Unknown	: The location of the incident is unknown.

[4] **Occupational Status:** Occupational or Non-Occupational

Occupational	: Work related. The individual was on the job at the time of the incident. This includes both paid employees and volunteers working in similar capacity to paid employees.
Non-Occupational	: Not work related. The individual was not on the job at the time of the incident. This category includes individuals on the way to or from work (before the start or after the end of their workday).

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Summary of Cases Reported in California[1] as Associated With[2] Pesticide Exposure Summarized by Gender, Age Distribution, by Type of Pesticide and by Type of Use
2004

Agricultural Use [3]

Age Group	Pesticides other than Antimicrobial Pesticides[4]			Antimicrobial Pesticides[4]			TOTAL
	Male	Female	Unknown	Male	Female	Unknown	
10 - 14	9	2	1	0	0	0	**12**
15 - 19	21	2	0	1	1	0	**25**
20 - 29	88	24	0	3	0	0	**115**
30 - 39	60	23	0	2	1	0	**86**
40 - 49	50	13	0	0	1	0	**64**
50 - 59	33	10	0	4	2	0	**49**
60 - 69	7	2	0	1	0	0	**10**
Unknown	21	8	0	0	0	0	**29**
TOTAL	**289**	**84**	**1**	**11**	**5**	**0**	**390**

Non-Agricultural Use [3]

Age Group	Pesticides other than Antimicrobial Pesticides			Antimicrobial Pesticides			TOTAL
	Male	Female	Unknown	Male	Female	Unknown	
0 - 9	5	3	0	0	0	0	**8**
10 - 14	11	7	0	0	0	0	**18**
15 - 19	3	2	0	9	12	0	**26**
20 - 29	19	6	0	31	43	0	**99**
30 - 39	13	10	0	30	47	0	**100**
40 - 49	20	16	0	30	39	0	**105**
50 - 59	9	5	0	11	25	0	**50**
60 - 69	1	1	0	2	5	0	**9**
70 +	2	0	0	0	0	0	**2**
Unknown	6	11	0	4	0	0	**21**
TOTAL	**89**	**61**	**0**	**117**	**171**	**0**	**438**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness and Surveillance Program.

[2] **Associated With:** Includes cases determined to be definitely, probably or possibly related to pesticide exposure

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Intended Use:** Agricultural/Non-Agricultural - Indicates whether the suspected pesticide(s) is intended to contribute to the production of agricultural commodities.

Agricultural : The pesticide(s) were intended to contribute to the production of agricultural commodities, including livestock. This includes: 1) agricultural research facilities, 2) handling of raw agricultural commodities in packing houses, 3) drift from agricultural applications into non-agricultural areas, and 4) transportation and storage of pesticides on farm lands. It excludes forestry operations, although they are classified as agricultural for regulatory purposes. It also excludes manufacture, transportation, and storage of pesticides prior to arrival at the site of agricultural production.

Non-Agricultural : The pesticide(s) were not intended to contribute to the production of agricultural commodities. This includes: 1) residential pesticide uses, 2) structural pest control, 3) rights-of-way, 4) parks, 5) landscaped urban areas, and 6) manufacture, transportation and storage of pesticides except on farm lands.

[4] **Antimicrobial Pesticide:** Pesticides used to kill or inactivate microbiological organisms (bacteria, viruses, etc.).

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Illnesses and Injuries of Application Workers Reported by California[1] Physicians Associated With[2] Pesticide Exposure Summarized by the Type of Equipment, Type of Activity and Occupational Status
2004

Occupational[3]

Type of Equipment[4]	Type of Activity[5]				
	Mixer/ Loader	Applicator	Flagger	Mechanic	Total
Fixed Wing Aircraft	1	0	0	0	**1**
Airblast Sprayers	3	10	0	2	**15**
Ground, Boom Below/Behind	0	1	0	1	**2**
Ground Boom, Other or Unspecified	1	4	0	1	**6**
Ground, Other or Unspecified	3	3	0	4	**10**
Pressurized Hose-Line Sprayers	2	15	0	0	**17**
Hand Pump Sprayer	0	5	0	0	**5**
Back Pack Sprayer	1	8	0	0	**9**
Unpressurized Hand-Held Spray Equipment	5	21	0	0	**26**
Aerosol Can	0	5	0	0	**5**
Aerosol/Fog Generating Equipment	0	1	0	0	**1**
Hand, Other or Unspecified	2	13	0	0	**15**
Fumigation in a Chamber	2	0	0	0	**2**
Fumigation with Tarp Containment	0	4	0	0	**4**
Automatic Equipment, Chlorinators	3	2	0	7	**12**
Automatic Equipment, Other or Unspecified	3	5	0	6	**14**
Immersion Equipment	17	19	0	0	**36**
Implements with Handles	5	10	0	0	**15**
Implements without Handles	0	8	0	0	**8**
Manual Placement	2	9	0	0	**11**
Manual Application Methods, Other or Unspecified	8	25	0	0	**33**
Not Applicable	0	0	0	1	**1**
Other	0	3	0	0	**3**
Unknown	13	25	0	0	**38**
Total Occupational Cases	**71**	**196**	**0**	**22**	**289**

Non-Occupational[3]

Type of Equipment[4]	Type of Activity[5]				
	Mixer/ Loader	Applicator	Flagger	Mechanic	Total
Unpressurized Hand-held Spray Equipment	0	1	0	0	**1**
Aerosol Can	0	1	0	0	**1**
Unknown	0	2	0	0	**2**
Total Non-Occupational Cases	**0**	**4**	**0**	**0**	**4**
Total Occupational and Non-Occupational Cases	**71**	**200**	**0**	**22**	**293**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program.

[2] **Associated With:** Includes cases classified as definitely, probably or possibly related to pesticide exposure

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

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Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Occupational Status:** Occupational or Non-Occupational

Occupational : Work related. The individual was on the job at the time of the incident. This includes both paid employees and volunteers working in similar capacity to paid employees.

Non-Occupational : Not work related. The individual was not on the job at the time of the incident. This category includes individuals on the way to or from work (before the start or after the end of their workday).

[4] **Type of Activity:** Activity of the injured individual at the time of exposure

Mixer/Loader : Mixes and/or loads pesticides. This includes: (1) removing a pesticide from its original container, (2) transferring the pesticide to a mixing or holding tank, (3) mixing pesticides prior to application, (4) driving a nurse rig, or (5) transferring the pesticide from a mix/holding tank or nurse rig to an application tank.

Applicator : Applies pesticides by any method or conducts activities considered ancillary to the application (e.g., cleans spray nozzles in the field).

Flagger : Flags for an aerial application, either fixed-winged or helicopter.

Mechanical	:	Maintains (e.g. cleans, repairs or conducts maintenance) pesticide contaminated equipment used to mix, load or apply pesticides as well as the protective equipment used by individuals involved in such activities. This excludes the following: 1) maintenance performed by applicators on their equipment incidental to the application; 2) maintenance performed by mixer/loaders on their equipment incidental to mixing and loading; 3) decontamination by HAZMAT teams.

[5] **Type of Equipment Used:** Defines the type of application equipment regardless of who performed the application. If the type of equipment is not represented on the table.

Fixed Wing Aircraft	:	Fixed wing aircraft.
Airblast Sprayers	:	Ground application equipment with a pump that delivers spray into an air stream created by a large fan at the back of the spray equipment.
Ground Boom Below/Behind	:	Ground application equipment with a spray boom located below or behind the equipment operator with the spray nozzles pointed downward.
Ground Boom, Other Or Unspecified	:	Ground application equipment with a spray boom. The following are excluded: 1) Ground Boom Below/Behind, 2) Over-The-Vine Boom, and 3) Electrostatic Sprayer.
Ground, Other Or Unspecified	:	Ground application equipment, unknown or unspecified. This includes two or more types of ground application
Pressurized Hose-Line Sprayers	:	Hand-held spray equipment attached by a long hose to a power-pressurized tank. This excludes hose-end sprayers, which are classified under hand, other or unspecified.
Hand Pump Sprayer	:	Hand-held compressed air sprayer with small volume tanks (1 to 5 gallons). This excludes backpack sprayers.
Back Pack Sprayer	:	Compressed air sprayer where the tank is worn on the back of the applicator.
Unpressurized Hand-Held Spray Equipment	:	Hand-held spray bottles (usually plastic) with built-in finger triggers.
Aerosol Can	:	Disposable pressurized cans designed for intermittent use. The pesticide is propelled out of the can by an inert compressed gas propellant. This excludes foggers.
Aerosol/Fog Generating Equipment	:	Refillable application equipment designed to disperse pesticide as a small airborne droplet, either in confined spaces or outdoor areas. These include truck-mounted equipment for outdoor use, hand-carried portable units and wall mounted electric units that are found in dairies, restaurants, etc.
Hand, Other Or Unspecified	:	Hand-held application equipment, other or unspecified. The equipment must propel the pesticide from a reservoir. This includes 1) hose-end sprayers, and 2) two or more types of hand-held application equipment. This excludes hand-held equipment already specified above.
Fumigation in a Chamber	:	An enclosed, sealed chamber designed specifically for fumigating or sterilizing the contents of the chamber.
Fumigation with Tarp Containment	:	Tarp placed over a commodity or structure and designed to restrict a fumigant to the application site.

Automatic Equipment, Chlorinators	:	Chlorination units that automatically inject chlorine into water for disinfection purposes. This includes chlorinators for swimming pools, packing houses and food processing plants.
Automatic Equipment, Other Or Unspecified	:	Equipment that automatically injects the pesticide to the target area. This includes equipment attached to milking machinery, dishwashers, etc. This excludes equipment already described above.
Immersion Equipment	:	Tanks, trays, sinks, etc. used for the dipping of animals, produce, bulbs, medical equipment, dishes, pots and pans, etc.
Implements With Handles	:	Mops, brushes, and other implements with handles.
Implements Without Handles	:	Cloths, towels, rags, sponges and other implements without handles.
Manual Placement	:	Manual placement of a pesticide directly to a target site. This includes bait stations, hand tossed pellets, and direct pouring of a pesticide onto a target surface from a container (such as pouring liquid chlorine directly into swimming pool water). This excludes the placement of fumigation pellet packs in chambers and under tarps.
Manual Application Methods, Other Or Unspecified	:	Manual application methods, other or unspecified. The pesticide is not propelled by any type of equipment. This includes two or more types of manual application methods. This excludes manual application method already described above.
Other	:	Any application methodology not described above. This includes two or more types of application equipment not elsewhere specified.
Unknown	:	The type of application equipment is not known.
Not Applicable	:	No application equipment is involved.

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About the Pesticide Illness Surveillance Program Data

Pesticide-related illnesses have been tracked within the state of California for more than 50 years. The California Environmental Protection Agency, Department of Pesticide Regulation (DPR) maintains a surveillance program which records human health effects of pesticide exposure. The Pesticide Illness Surveillance Program (PISP) documents information on adverse effects from pesticide products, whether elicited by the active ingredients, inert ingredients, impurities, or breakdown products. This program maintains a database, which is utilized for evaluating the circumstances of pesticide exposures resulting in illness. This database is consulted regularly by staff who evaluate(s) the effectiveness of the DPR pesticide safety programs and recommend changes when appropriate.

Hospitalization and Disability Associated with Illnesses/Injuries *Definitely or Probably Related* to Pesticide Exposure in California[1,2], Summarized by Occupational Status and Activity 2004

Occupational[3]

Activity[4]	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown[5]	No. Cases	%	Unknown[6]
Mixer/Loader	63	1	1.6	0	13	20.6	1
Applicator	140	2	1.4	1	24	17.1	7
Mechanical	17	0	0	0	3	17.6	1
Packaging/Processing	28	0	0	0	5	17.9	2
Field Worker	138	5	3.6	0	26	18.8	4
Routine Indoor	38	1	2.6	0	10	26.3	1
Routine Outdoor	10	0	0	0	1	10	0
Manufacturing/Formulation	4	0	0	0	0	0	0
Transport/Storage/Disposal	15	0	0	1	4	26.7	1
Emergency Response	2	0	0	0	1	50	0
Other	39	1	2.6	0	5	12.8	1
Unknown	1	0	0	0	0	0	1
All Occupational	**495**	**10**	**2**	**2**	**92**	**18.6**	**19**

Non- Occupational[3]

Activity[4]	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown[5]	No. Cases	%	Unknown[6]
Applicator	3	0	0	0	0	0	1
Routine Indoor	35	0	0	0	1	2.9	22
Routine Outdoor	4	0	0	0	0	0	2
Other	15	2	13.3	0	2	13.3	12
All Non-Occupational	**57**	**2**	**3.5**	**0**	**3**	**5.3**	**37**
ALL CASES	**552**	**12**	**2.2**	**2**	**95**	**17.2**	**56**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program.

[2] **Relationship:** Degree of correlation between pesticide exposure and resulting symptomatology.

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

[3] **Occupational Status:** Occupational or Non-Occupational

Occupational : Work related. The individual was on the job at the time of the incident. This includes both paid employees and volunteers working in similar capacity to paid employees.

Non-Occupational : Not work related. The individual was not on the job at the time of the incident. This category includes individuals on the way to or from work (before the start or after the end of their workday).

[4] **Type of Activity:** Activity of the individual at the time of exposure.

Mixer/Loader : Mixes and/or loads pesticides. This includes: (1) removing a pesticide from its original container, (2) transferring the pesticide to a mixing or holding tank, (3) mixing pesticides prior to application, (4) driving a nurse rig, or (5) transferring the pesticide from a mix/holding tank or nurse rig to an application tank.

Applicator : Applies pesticides by any method or conducts activities considered ancillary to the application (e.g., cleans spray nozzles in the field).

Mechanical : Maintains (e.g. cleans, repairs or conducts maintenance) pesticide contaminated equipment used to mix, load or apply pesticides as well as the protective equipment used by individuals involved in such activities. This excludes the following: 1) maintenance performed by applicators on their equipment incidental to the application; 2) maintenance performed by mixer/loaders on their equipment incidental to mixing and loading; 3) decontamination by HAZMAT teams.

Packaging and Processing : Handles (packs, processes or retails agricultural commodities from the packing house to the final market place. Field packing of agricultural commodities is classified as field worker.

Field Worker : Works in an agricultural field performing tasks such as advising, scouting, harvesting, thinning, irrigating, driving tractor (except as part of an application), field packing, conducting cultural work in a greenhouse, etc. Researchers performing similar tasks in an agricultural field are also included.

Routine Indoor : Conducts activities in an indoor environment with minimal expectation for exposure to pesticides. This includes people in offices and businesses, residential structures, etc. who are not handling pesticides.

Routine Outdoor : Conducts activities in an outdoor environment with minimal expectation for exposure to pesticides. This excludes field workers in agricultural fields. This includes gardeners who are not handling pesticides.

Manufacturing and Formulation : Manufactures, processes or packages pesticides. This includes “mixing” if it is done in a plant for application elsewhere.

Transport/ Storage/ Disposal	:	Transports or stores pesticides between packaging and preparation for use. This includes shipping, warehousing and retailing as well as storage by the end-user prior to preparation for use. Disposal of unused pesticides is also included in this activity. This excludes driving a nurse rig to an application site.
Emergency Response	:	Emergency Response Personnel (Police, fire, ambulance and HAZMAT personnel) responding to a fire, spill, accident or any other pesticide incident in the line of duty.
Other	:	Activity is not adequately described by any other activity category. This includes but is not limited to: 1) being inside a vehicle; 2) dog groomers not handling pesticides; 3) individuals handling pesticide treated wood; 4) two or more activities with potential for pesticide exposure.
Unknown	:	Activity is not known

[5] **Hospitalization Unknown:** Investigation did not specify whether hospitalization occurred or not.

[6] **Disability Unknown:** Investigation did not specify whether disability occurred or not.

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Hospitalization and Disability Associated with Illnesses/Injuries *Possibly Related* to Pesticide Exposure in California[1,2], Summarized by Occupational Status and Activity 2004

Occupational[3]

Activity[4]	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown[5]	No. Cases	%	Unknown[6]
Mixer/Loader	8	0	0	0	3	37.5	0
Applicator	56	0	0	0	8	14.3	2
Mechanical	6	0	0	0	0	0	0
Packaging/Processing	3	0	0	0	0	0	0
Field Worker	131	0	0	0	9	6.9	3
Routine Indoor	22	0	0	0	4	18.2	1
Routine Outdoor	12	0	0	0	0	0	5
Manufacturing/Formulation	1	0	0	0	0	0	0
Transport/Storage/Disposal	2	0	0	0	0	0	0
Other	21	1	4.8	1	4	19	2
All Occupational	**262**	**1**	**0.4**	**1**	**28**	**10.7**	**13**

Non-Occupational[3]

Activity	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown[5]	No. Cases	%	Unknown[6]
Applicator	1	0	0	0	1	100	0
Routine Indoor	7	0	0	0	0	0	2
Routine Outdoor	3	0	0	0	0	0	2
Other	3	1	33.3	0	0	0	1
All Non-Occupational	**14**	**1**	**7.1**	**0**	**1**	**7.1**	**5**
All Cases	**276**	**2**	**0.7**	**1**	**29**	**10.5**	**18**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program.

[2] **Relationship:** Degree of correlation between pesticide exposure and resulting symptomatology.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Occupational Status:** Occupational or Non-Occupational

Occupational	: Work related. The individual was on the job at the time of the incident. This includes both paid employees and volunteers working in similar capacity to paid employees.
Non-Occupational	: Not work related. The individual was not on the job at the time of the incident. This category includes individuals on the way to or from work (before the start or after the end of their workday).

[4] **Type of Activity:** Activity of the individual at the time of exposure.

Mixer/Loader	: Mixes and/or loads pesticides. This includes: (1) removing a pesticide from its original container, (2) transferring the pesticide to a mixing or holding tank, (3) mixing pesticides prior to application, (4) driving a nurse rig, or (5) transferring the pesticide from a mix/holding tank or nurse rig to an application tank.
Applicator	: Applies pesticides by any method or conducts activities considered ancillary to the application (e.g., cleans spray nozzles in the field).
Mechanical	: Maintains (e.g. cleans, repairs or conducts maintenance) pesticide contaminated equipment used to mix, load or apply pesticides as well as the protective equipment used by individuals involved in such activities. This excludes the following: 1) maintenance performed by applicators on their equipment incidental to the application; 2) maintenance performed by mixer/loaders on their equipment incidental to mixing and loading; 3) decontamination by HAZMAT teams.
Packaging and Processing	: Handles (packs, processes or retails agricultural commodities from the packing house to the final market place. Field packing of agricultural commodities is classified as field worker.
Field Worker	: Works in an agricultural field performing tasks such as advising, scouting, harvesting, thinning, irrigating, driving tractor (except as part of an application), field packing, conducting cultural work in a greenhouse, etc. Researchers performing similar tasks in an agricultural field are also included.
Routine Indoor	: Conducts activities in an indoor environment with minimal expectation for exposure to pesticides. This includes people in offices and businesses, residential structures, etc. who are not handling pesticides.
Routine Outdoor Manufacturing and Formulation	: Manufactures, processes or packages pesticides. This includes “mixing” if it is done in a plant for application elsewhere.
Transport/ Storage/ Disposal	: Transports or stores pesticides between packaging and preparation for use. This includes shipping, warehousing and retailing as well as storage by the end-user prior to preparation for use. Disposal of unused pesticides is also included in this activity. This excludes driving a nurse rig to an application site.
Other	: Activity is not adequately described by any other activity category. This includes but is not limited to: 1) being inside a vehicle; 2) dog groomers not handling pesticides; 3) individuals handling pesticide treated wood; 4) two or more activities with potential for pesticide exposure.

[5] **Hospitalization Unknown:** Investigation did not specify whether hospitalization occurred or not.

[6] **Disability Unknown:** Investigation did not specify whether disability occurred or not.

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Agricultural Drift Cases Reported in California[1] Associated With[2] Pesticide Exposure Summarized by Application Sites[3]
2004

Application Site[3]	Number of Cases[4]	Number of Incidents[5]
CITRUS		
Oranges	5	1
FIXTURES		
Agricultural & Farm Equipment (Other or Unspecified)	1	1
FRUITING VEGETABLE		
Tomatoes	2	2
GRAPES		
Grapes	22	9
LEAFY/STEM VEGETABLE		
Broccoli	6	1
Lettuce	3	3
Spinach	46	3
NON-CROP		
Soil	2	2
Uncultivated Agricultural Areas (Other or Unspecified)	1	1
NUT TREES		
Almonds	12	4
ORNAMENTAL		
Ornamental Plants (Other or Unspecified)	1	1
OTHER VEGETABLE		
Asparagus (Spears, Ferns, Etc.)	2	1
Onions (Dry)	1	1
PREMISES		
Dairy Farm Milk Handling Facilities & Equipment	1	1
Food Processing/Handling Plant/Area (Other or Unspecified)	1	1
ROOT CROP VEGETABLE		
Carrots	2	1
Potatoes	122	1

Application Site[3]	Number of Cases[4]	Number of Incidents[5]
SEEDS		
Seeds (Agricultural & Ornamental)	1	1
STONE FRUIT		
Nectarines	1	1
Peaches	1	1
TOTAL	**233**	**37**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness and Surveillance Program.

[2] **Associated With:** Includes cases determined to be definitely, probably or possibly related to pesticide exposure

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Application Sites:** The intended site of the pesticide application. For crops, this includes applications at the growing site or to the commodity while being packed for sale.

[4] **Cases:** Indicates the number of individuals exposed in one incident of agricultural drift.

[5] **Incidents:** Indicates the number of episodes where agricultural pesticide drift occurred based on the application site. An incident may involve more than one person (or case).

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Agricultural Drift Cases[1] Reported by California Physicians as Associated With[2] Pesticide Exposure Summarized by the Activity of the Exposed Person and by the Type of Application Equipment Used
2004

Type of Application Equipment Used [3]	Type of Activity [4]				TOTAL
	Routine Indoor	Routine Outdoor	Field Worker	Other	
Fixed Wing Aircraft	0	2	0	3	**5**
Helicopter	0	6	158	0	**164**
Airblast Sprayers	3	6	0	5	**14**
Ground, Boom Below/Behind	0	0	11	0	**11**
Ground Boom, Other or Unspecified	0	0	1	1	**2**
Ground, Other or Unspecified	0	0	6	13	**19**
Shank Injection with Tarps	0	0	1	0	**1**
Pressurized Hose-Line Sprayers	0	0	1	1	**2**
Unpressurized Hand-Held Spray Equipment	0	0	1	1	**2**
Fumigation in a Chamber	1	0	0	0	**1**
Fumigation with Tarp containment	0	0	0	8	**8**
Automatic Equipment, Chlorinators	0	0	1	0	**1**
Automatic Equipment, Other or Unspecified	0	0	0	1	**1**
Other	0	0	0	1	**1**
Unknown	0	0	0	1	**1**
TOTAL	**4**	**14**	**180**	**35**	**233**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program

[2] **Associated With:** Includes cases determined to be definitely, probably or possibly related to pesticide exposure

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Type of Equipment Used:** Defines the type of application equipment regardless of who performed the application.

Fixed Wing Aircraft	: Fixed wing aircraft.
Helicopter	: Helicopter.
Airblast Sprayers	: Ground application equipment with a pump that delivers spray into an air stream created by a large fan at the back of the spray equipment.
Ground Boom Below/Behind	: Ground application equipment with a spray boom located below or behind the equipment operator with the spray nozzles pointed downward.
Ground Boom, Other Or Unspecified	: Ground application equipment with a spray boom. The following are excluded: 1) Ground Boom Below/Behind, 2) Over-The-Vine Boom, and 3) Electrostatic Sprayer.
Ground, Other Or Unspecified	: Ground application equipment, unknown or unspecified. This includes two or more types of ground application equipment
Shank Injection With Tarps	: Ground application equipment that uses a shank or other piece of equipment to directly apply a pesticide into the soil. A tarp is placed over the soil to restrict the pesticide to the application site.
Pressurized Hose-Line Sprayers	: Hand-held spray equipment attached by a long hose to a power-pressurized tank. This excludes hose-end sprayers, which are classified under hand, other or unspecified.
Unpressurized Hand-Held Spray Equipment	: Hand-held spray bottles (usually plastic) with built-in finger triggers.
Chamber	: An enclosed, sealed chamber designed specifically for fumigating or sterilizing the contents of the chamber.
Tarp	: Tarp placed over a commodity or structure and designed to restrict a fumigant to the application site.
Automatic Equipment, Chlorinators	: Chlorination units that automatically inject chlorine into water for disinfection purposes. This includes chlorinators for swimming pools, packing houses and food processing plants.
Automatic Equipment, Other Or Unspecified	: Equipment that automatically injects the pesticide to the target area. This includes equipment attached to milking machinery, dishwashers, etc. This excludes equipment already described above.
Other	: Any application methodology not described above. This includes two or more types of application equipment not elsewhere specified.
Unknown	: The type of application equipment is not known.

[4] **Type of Activity:** Activity of the individual at the time of exposure.

Field Worker	:	Works in an agricultural field performing tasks such as advising, scouting, harvesting, thinning, irrigating, driving tractor (except as part of an application), field packing, conducting cultural work in a greenhouse, etc. Researchers performing similar tasks in an agricultural field are also included.
Routine Indoor	:	Conducts activities in an indoor environment with minimal expectation for exposure to pesticides. This includes people in offices and businesses, residential structures, etc. who are not handling pesticides.
Routine Outdoor	:	Conducts activities in an outdoor environment with minimal expectation for exposure to pesticides. This excludes field workers in agricultural fields. This includes gardeners who are not handling pesticides.
Other	:	Activity is not adequately described by any other activity category. This includes but is not limited to: 1) being inside a vehicle; 2) dog groomers not handling pesticides; 3) individuals handling pesticide treated wood; 4) two or more activities with potential for pesticide exposure.

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Illnesses and Injuries in California[1] Associated With Pesticide Residue in Agricultural Fields, 1982-2004

Year	Systemic/ Respiratory[2]		Topical[2]		TOTAL
	Definite/ Probable[3]	Possible[3]	Definite/ Probable[3]	Possible[3]	
1982	23	43	48	117	**231**
1983	19	29	41	96	**185**
1984	7	9	50	112	**178**
1985	20	20	161	168	**369**
1986	29	10	156	63	**258**
1987	58	80	53	182	**373**
1988	57	35	75	204	**371**
1989	17	22	30	93	**162**
1990	3	32	11	119	**165**
1991	16	37	7	87	**147**
1992	11	57	19	112	**199**
1993	10	38	2	67	**117**
1994	33	31	5	42	**111**
1995	20	48	74	89	**231**
1996	29	37	15	60	**141**
1997	83	44	20	62	**209**
1998	40	19	5	47	**111**
1999	23	17	0	42	**82**
2000	21	30	2	22	**75**
2001	7	22	0	17	**46**
2002	30	23	13	12	**78**
2003	4	17	4	33	**58**
2004	15	27	1	25	**68**
Total	**575**	**727**	**792**	**1871**	**3965**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness and Surveillance Program.

[2] **Type of Illness:** Categorization of the type of symptoms experienced.

Systemic : Any health effects not limited to the respiratory or skin and/or eye. Cases involving multiple illness symptom types including systemic symptoms are included in the systemic category.

Respiratory : Health effects involving any part of the respiratory tree.

Topical : Health effects involving only the eyes and/or skin. This excludes outward physical signs (miosis and lacrimation) related to effects on internal bodily systems. These signs are classified under 'Systemic.'

[3] **Associated With:** Includes cases classified as definitely, probably or possibly related to pesticide exposure.

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

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Incidents Involving *Field Workers* Reported in California[1] Associated With[2] Pesticide Residue Exposure Summarized by Crop and Type of Illness 2004

Crop	Systemic/ Respiratory[3]		Topical[3]		TOTAL
	Definite/ Probable	Possible	Definite/ Probable	Possible	
CITRUS					
Oranges	0	5	0	1	6
CUCURBITS					
Cucumbers	0	0	0	1	1
FIBER CROP					
Cotton	1	1	1	0	3
FORAGE CROP					
Alfalfa	0	1	0	0	1
FRUITING VEGETABLE					
Tomatoes	0	1	0	2	3
GRAPES					
Grapes	0	11	0	13	24
LEAFY/STEM VEGETABLE					
Broccoli	6	3	0	1	10
Cauliflower	0	1	0	0	1
Celery	0	1	0	0	1
Lettuce	4	1	0	0	5
Spinach	1	1	0	0	2
MULTIPLE					
Avocados, Greenhouses (Environs, Benches, Etc.)	2	0	0	0	2
NON-CROP					
Soil	0	1	0	0	1
NUT TREES					
Almonds	0	0	0	1	1
Walnuts	0	0	0	1	1
ORNAMENTAL					
Ornamental Plants (Other or Unspecified)	1	0	0	0	1

Crop	Systemic/ Respiratory[3]		Topical[3]		TOTAL
	Definite/ Probable	Possible	Definite/ Probable	Possible	
POME FRUIT					
Pears	0	0	0	1	1
SEEDS					
Seeds (Agricultural & Ornamental)	0	0	0	2	2
STONE FRUIT					
Peaches	0	0	0	1	1
VEGETABLE, OTHER					
Onions (Dry)	0	0	0	1	1
TOTAL	**15**	**27**	**1**	**25**	**68**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness and Surveillance Program.

[2] **Associated With:** Includes cases classified as definitely, probably or possibly related to pesticide exposure

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Type of Illness:** Categorization of the type of symptoms experienced.

Systemic : Any health effects not limited to the respiratory or skin and/or eye. Cases involving multiple illness symptom types including systemic symptoms are included in the systemic category.

Respiratory : Health effects involving any part of the respiratory tree.

Topical : Health effects involving only the eyes and/or skin. This excludes outward physical signs (miosis and lacrimation) related to effects on internal bodily systems. These signs are classified under 'Systemic.'

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About the Pesticide Illness Surveillance Program Data

Pesticide-related illnesses have been tracked within the state of California for more than 50 years. The California Environmental Protection Agency, Department of Pesticide Regulation (DPR) maintains a surveillance program which records human health effects of pesticide exposure. The Pesticide Illness Surveillance Program (PISP) documents information on adverse effects from pesticide products, whether elicited by the active ingredients, inert ingredients, impurities, or breakdown products. This program maintains a database, which is utilized for evaluating the circumstances of pesticide exposures resulting in illness. This database is consulted regularly by staff who evaluate(s) the effectiveness of the DPR pesticide safety programs and recommend changes when appropriate.

Pesticide-Associated Illnesses and Injuries Reported In California Schools[1, 2] by Exposure Category, Pesticide Type and Illness Symptoms 2004

Exposure[3]	Systemic/Respiratory[4]			Topical[4]			TOTAL
	Antimicrobials[5]	Cholinesterase Inhibitors[5]	Other Pesticides[5]	Antimicrobials[5]	Cholinesterase Inhibitors[5]	Other Pesticides[5]	
Drift	3	0	1	0	0	0	**4**
Residue	0	0	9	1	0	0	**11**
Direct Spray/Squirt	0	0	1	1	0	0	**2**
Spill/Other Direct	0	0	0	10	0	1	**11**
Multiple Exposures	0	0	1	0	0	0	**1**
Other	0	21	0	0	0	0	**21**
Unknown	1	0	1	1	0	0	**3**
TOTAL	**4**	**21**	**13**	**13**	**0**	**1**	**53**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program.

[2] **Associated With:** Includes cases classified as definitely, probably or possibly related to pesticide exposure

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Type of Exposure:** Characterization of how an individual came in contact with a pesticide. Exposure categories not listed on the table indicate there were no illnesses that occurred under that category.

Drift	:	Spray, mist, fumes, or odor carried from the target site by air. Drift must be related to an application or mix/load activity.
Residue	:	The part of a pesticide that remains in the environment for a period of time following an application or drift. This includes odor after the completion of an application.
Direct Spray/Squirt	:	Material propelled by the application or mix/load equipment. Contact with the material can be by direct projection or ricochet. This includes exposure of mechanics working on application or mix/load equipment when the material is forced out by pressure.
Spill/Other Direct	:	Any of the following: 1) Contact made during an application or mixing/loading operation where the material is not propelled by the equipment; 2) Expected direct contact during use (e.g. washing dishes in a disinfectant solution); or 3) Leaks, spills, etc. not related to an application.
Multiple	:	Contact with pesticides occurred through two or more mechanisms.
Other	:	Other known route of exposure not included in other exposure categories. This includes, but not limited to: 1) Residue from a spill and 2) Exposure to smoke or pyrolitic products from a fire where pesticides are burning.
Unknown	:	Route of exposure is not known.

[4] **Type of Illness:** Categorization of the type of symptoms experienced.

Systemic	:	Any health effects not limited to the respiratory, skin and/or eye. Cases involving multiple illness symptom types including systemic symptoms are included in the systemic category.
Respiratory	:	Health effects involving any part of the respiratory tree.
Topical	:	Health effects involving only the eyes and/or skin. This excludes outward physical signs (miosis and lacrimation) related to effects on internal bodily systems. These signs are classified under 'Systemic.'

[5] **Type of Pesticide:** Type of pesticide based on functional class.

Antimicrobials	:	Pesticides used to kill or inactivate microbiological organisms (bacteria, viruses, etc.).
Cholinesterase Inhibitors	:	Pesticides known to inhibit the function of the cholinesterase enzyme.
Other Pesticides	:	Any pesticide that is not an antimicrobial or cholinesterase-inhibiting pesticide.

Whom to Contact:

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